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Abbreviations:

BMD Bone Mineral Density

BMI Body Mass Index

CB Chlorobiphenyl

OSCAR Osteoporosis Cadmium as a Risk Factor

PCBs Polychlorinated biphenyls

p,p'-DDE 1,1-dichloro-2,2-*bis*(p-chloro-phenyl)ethylene

TEF Toxic equivalency factor

TEQ Toxic equivalency

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Abstract

Background: Bone toxicity has been linked to organochlorine exposure following a few notable poisoning incidents, but epidemiological studies in populations with environmental organochlorine exposure have found inconsistent results.

Objectives: The aim of this study was to investigate whether organochlorine exposure was associated with bone mineral density (BMD) in a population aged 60-81 years (154 males; 167 females) living close to the Baltic coast and to a PCB contaminated river.

Methods: Forearm BMD was measured in participants using dual energy X-ray absorptiometry; low bone mineral density was assessed using age- and sex-standardized Z-scores. Blood samples were analysed for five dioxin-like PCBs, the three most abundant non-dioxin-like PCBs and p,p'-DDE.

Results: In males, dioxin-like chlorobiphenyl (CB) 118 was negatively associated with BMD; the odds ratio for low BMD (Z-score <-1) was 1.06 (95% confidence interval 1.01-1.12) per 10pg/ml CB 118. The sum of the three most abundant non-dioxin-like PCBs was positively associated with BMD, but not with a decreased risk of low BMD. In females, CB 118 was positively associated with BMD, however this congener did not influence the risk of low BMD in women.

Conclusions: Environmental organochlorine exposures experienced by this population sample from Sweden since the 1930's may have been sufficient to result in sex-specific changes in BMD.